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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,490	03/31/2004	Toshihisa Takeyama	KOT-0094	8491

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EXAMINER

ANGEBRANNDT, MARTIN J

ART UNIT	PAPER NUMBER
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1756

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05/24/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/815,490	Applicant(s) TAKEYAMA, TOSHIHISA	
	Examiner Martin J. Angebrannt	Art Unit 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters; prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. The response of the applicant has been read and given careful consideration. Responses to the arguments of the applicant are presented after the first rejection to which they are directed. The terminal disclaimer is proper and obviates the obvious double patenting rejections.

Rejections of the previous office action, not repeated below are

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1,4,5,7-9,14,16,17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawabata et al. '340, in view of Crivello '654.

Kawabata et al. '340 in examples 16-18, a mixture of cationically curable materials, free radical curable materials (bis(4-acryloxydiethoxyphenyl)methane), a radically polymerization initiator, a sensitizing dye (dye 1) and a triphenylsulfonium hexafluorophosphate as the cationic polymerization initiators (table 4, col 11) which was applied to a glass plate and overcoated with a polyethylene film, exposed to the interference light and then postcured with a flood exposure from a mercury lamp (7/55-8/40). The use of various onium salts is disclosed. (6/8-18).

Crivello '654 teaches cationic photoinitiators including those shown in column 3, including dialkylaryl sulfonium and triphenylsulfonium compounds.

It would have been obvious to one skilled in the art to modify to cited example of Kawabata et al. '340 by using the dialkylaryl or cyclic sulfonium compounds in place of the triarylsulfonium compound used as the photoinitiator with a reasonable expectation of forming a useful photosensitive composition based upon the disclosure of equivalence by Crivello '654.

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The binder compounds disclosed at [0148-0157] of the prepub are small molecules, which are capable of forming a binder. They are not polymeric. The claims do not require that these be polymers, so while it might be considered a little misleading, the claims as interpreted through the specification clearly does not require these to be polymers. The examiner is well aware that there are two initiation systems, but the applicant's analysis fails to appreciate that the sulfonium salts can be activated either through heat or light (UV). The applicant also fails to appreciate that sulfonium salts, including those set forth in the claims, inherently can initiate either free radical or cationic polymerization as evidenced by Kawabata et al. '340 and if the applicant wishes to exclude the case where a single compound can be used for either type of initiation (thermal vs. photo or free radical vs cationic), then the photoinitiator should be specified. If the applicant intends to further describe these, then the specification should be amended to identify those compounds disclosed in the references cited at [0095] which of the references they are found in and provide copies of those references. **The claims rejected under this heading are directed to the composition, and so the argument regarding use are merely intended use, the exception being claim 20, which does not describe the curing of the binder compound, but does describe irradiating the composition with light or subjecting it to heat. If the intent is to limit the claims to the thermal cure, then the claims should have this as a required step.** The applicant argues as if two different polymerization systems are not taught by Kawabata et al. '340, this is flawed on its face. The modification of Kawabata et al. '340 through the teachings of Crivello '654 is merely exchanging one sulfonium for another, noting that there is a disclosure of equivalence between only seven sulfonium compounds, so there cannot be excessive picking and choosing required. **There is no comparative data evidencing**

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unexpected results for the inventive sulfonium salts over the triaryl salts. The applicant's argument as if those of Crivello are not suitable thermal initiators is unsupported, while the examiner's position of inherency is supported by Roth et al. '814 (cited below).

4. Claims 1,3-5,7-9,14,16,17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohkuma et al. '634, in view of Crivello '654.

Ohkuma et al. '634 in examples 6-8, a mixture of cationically curable materials, free radical curable materials, a radically polymerization initiator (4-diethylamino-ethylbenzoate), a sensitizing dye (dye 1, methylene blue) and a triphenylsulfonium trifluoroacetic acid as the cationic polymerization initiators (col 15) which was applied to a glass plate and overcoated with a polyethylene film to a thickness of 7 to 23 microns, exposed to the interference light and then postcured with a flood exposure from a mercury lamp (11/4-65). The use of various onium salts is disclosed. (9/35-10/30).

It would have been obvious to one skilled in the art to modify to cited example of Ohkuma et al. '634 by using the dialkylaryl or cyclic sulfonium compounds in place of the triarylsulphonium compound used as the photoinitiator with a reasonable expectation of forming a useful photosensitive composition based upon the disclosure of equivalence by Crivello '654. The trifluoroacetic acid is present as the counter ion and is consider acid multiplying (see prepub of instant specification at [0108]).

The rejection stands for the reasons above, noting that in this case, there are two separate initiation systems.

5. Claims 1,3-9,14,16,17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohkuma et al. '634, in view of Crivello '654, further in view of Otaki et al. '744

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Otaki et al. '744 teach cationically curable materials including epoxies, cyclic ethers and oxetane rings (5/25-42).

In addition to the basis above, it would have been obvious to use other cationically curable moieties, such as oxetane, in place of epoxide rings used in the media resulting from the combination of Ohkuma et al. '634 and Crivello '654 with a reasonable expectation of forming a useful holographic recording medium based upon the disclosure of equivalence by Otaki et al. '744.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Ohkuma et al. '634 and Otaki et al. '744 references are both within the holographic field and all the references are concerned with photopolymerization, including cationic polymerization and so are analogous. One skilled in the art would expect the cationically curable monomers disclosed by Otaki et al. '744 to be curable in the system resulting from the combination of Ohkuma et al. '634 and Crivello '654 and based upon their use in holography, be suitable to for holographic processing. The rejection stands.

6. Claims 1,3-5,7-14 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar et al. '551, in view of Ohkuma et al. '634, Crivello '654, Roth et al. '814 and Hegel et al. '008.

Dhar et al. '551 teach in example 1, an acrylate monomer and CGI-784 as the photoinitiator mixed with matrix precursors dibutyltin dilaurate, diisocyanate terminated

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polypropylene glycol and dihydroxypolypropylene glycol, which are heated (13/65-15).

Examples 3 and 4 are similar, place the composition between two glass slides with a spacer and after curing of the matrix are used to record holograms. The ability to form thick recording layers of more than 200 microns is disclosed. (3/13-19,4/3-12). Useful photoactive monomers including acrylates are disclosed as useful in this system. (6/51-67). A reduction in shrinkages of the hologram is also realized (7/1-48). The use of various reactions including cationic epoxy or vinyl ether polymerization to form the matrix is disclosed. (6/26-50)

Roth et al. '814 establishes that sulfonium salts are able to thermally initiate cationic polymerization (1/9+).

Hegel et al. '008 teach in example 1, an acrylate monomer and IRG-784 as the photoinitiator mixed with matrix precursors dibutyltin diacetate, diisocyanate terminated polypropylene glycol and dihydroxypolypropylene glycol, which are placed between 1.2 mm substrates with a 500 micron spacer and after curing of the matrix [0031-0040]. The formation of holograms using these is disclosed. [0052-0056]. Useful photoactive monomers including acrylates are disclosed as useful in this system. [0029]. A reduction in shrinkages of the hologram is also realized. The provision of antireflection coatings on one or both of the substrates is disclosed. [0016,0018]. The substrates may be 0.5-1.3 mm thick [0019].

It would have been obvious to modify the teachings of Dhar et al. '551 by using an epoxy precursor such as those resulting from the combination of Ohkuma et al. '634 and Crivello '654 as discussed above for the matrix based upon the disclosure and the evidence of compatibility in holographic systems including free radically curable compositions from Ohkuma et al. '634 and the evidence from Roth et al. '814 that sulfonium salts are known to act as thermal cationic

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curing agents and to use the glass substrates, spacers and AR coatings taught by Hegel et al. '008 based upon the similarity with Dhar et al. '551.

The applicant argues that Dhar et al. does not disclose the initiators recited in the claims. This is correct, but the rejection is not based merely upon this reference and the matrix corresponds to the binder of the applicant's claims. Roth et al. teaches the curing at low temperatures as low as 20 degrees C, which is comparable to the room temperature (25 degrees C) described in Dhar et al. '551. Therefore the combination is reasonable to one skilled in the art and self consistent. The scope of the thermal initiators embraced both Crivello '654 and Roth et al. '814 there is no data to support a position of unobvious results over other sulfonium salts.

The applicant might consider requiring heating in the process claims, particularly at temperatures significantly above room temperature to attack the combination based upon the desirability in Dhar et al. to keep the temperatures relatively low. The rejection stands.

7. Claims 1,3-5 and 7-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar et al. '551, in view of Ohkuma et al. '634, Crivello '654, Roth et al. '814 and Hegel et al. '008, further in view of Horimai et al., WO 02/15176

Horimai et al., WO 02/15176 (Hormai et al. '891 is US equivalent) teaches with respect to figure 1, a holographic recording medium which comprises a substrate (2), a holographic recording layer (photopolymers) (3), a second substrate (4) and a reflective layer (5). The reflective layer and the recording layer can be next to each other (12/5-23; 11/40-64). The interference fringes results from the interferences from the light passing through the layer toward the reflective layer and that reflected back into the laser from the reflective layer. (col 5. ?; 4/53-5/7).

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In addition to the basis provided above, it would have been obvious to one skilled in the art to modify the embodiments rendered obvious by the combination of Dhar et al. '551 with Ohkuma et al. '634, Crivello '654, Roth et al. '814 and Hegel et al. '008 as set forth above by adding a reflective layer on the further substrate as taught Horimai et al., WO 02/15176 to allow holographic recording without a second beam.

The rejection stands for the reasons above as no further arguments were directed at this rejection.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

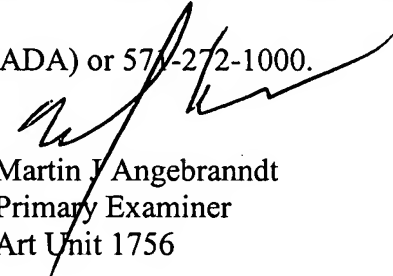
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebrannndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Martin J. Angebranndt
Primary Examiner
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05/21/07